

# Surface-Mount Ultrafast Plastic Rectifier


**SMB (DO-214AA)**

Anode  Cathode

## FEATURES

- Glass passivated pellet chip junction
- Ideal for automated placement
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power losses
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2.0 A
$V_{RRM}$	50 V, 100 V, 150 V, 200 V
$I_{FSM}$	50 A
$t_{rr}$	20 ns
$V_F$	0.90 V
$T_J \text{ max.}$	150 °C
Package	SMB (DO-214AA)
Circuit configuration	Single

## TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, automotive, and telecommunication.

## MECHANICAL DATA

**Case:** SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified

Base P/NHME3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B, ....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

## MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT
Device marking code		EA	EB	EC	ED	
Maximum repetitive peak reverse voltage	$V_{RRM}$	50	100	150	200	V
Maximum RMS voltage	$V_{RMS}$	35	70	105	140	V
Maximum DC blocking voltage	$V_{DC}$	50	100	150	200	V
Maximum average forward rectified current at $T_L = 110\text{ °C}$	$I_{F(AV)}$	2.0				A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	50				A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +150				°C

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	TEST CONDITIONS		SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT
Maximum instantaneous forward voltage	2.0 A		$V_F$ <sup>(1)</sup>	0.90				V
Maximum DC reverse current at rated DC blocking voltage		$T_A = 25\text{ }^{\circ}\text{C}$	$I_R$	10				$\mu\text{A}$
		$T_A = 100\text{ }^{\circ}\text{C}$		350				
Max. reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$		$t_{rr}$	20				ns
Maximum reverse recovery time	$I_F = 2.0\text{ A}$ , $V_R = 30\text{ V}$ , $dI/dt = 50\text{ A}/\mu\text{s}$ , $I_r = 10\text{ \% }I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	$t_{rr}$	30				ns
		$T_J = 100\text{ }^{\circ}\text{C}$		50				
Maximum stored charge	$I_F = 2.0\text{ A}$ , $V_R = 30\text{ V}$ , $dI/dt = 50\text{ A}/\mu\text{s}$ , $I_r = 10\text{ \% }I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	$Q_{rr}$	10				nC
		$T_J = 100\text{ }^{\circ}\text{C}$		25				
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	18				pF

**Note**

(1) Pulse test: 300 ms pulse width, 1 % duty cycle

**THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	75				°C/W
	$R_{\theta JL}^{(1)}$	20				

**Note**

(1) Units mounted on PCB 5.0 mm x 5.0 mm (0.013 mm thick) land areas

**ORDERING INFORMATION** (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ES2D-E3/52T	0.096	52T	750	7" diameter plastic tape and reel
ES2D-E3/5BT	0.096	5BT	3200	13" diameter plastic tape and reel
ES2DHE3_A/H <sup>(1)</sup>	0.096	H	750	7" diameter plastic tape and reel
ES2DHE3_A/I <sup>(1)</sup>	0.096	I	3200	13" diameter plastic tape and reel
ES2D-M3/52T	0.096	52T	750	7" diameter plastic tape and reel
ES2D-M3/5BT	0.096	5BT	3200	13" diameter plastic tape and reel
ES2DHM3_A/H <sup>(1)</sup>	0.096	H	750	7" diameter plastic tape and reel
ES2DHM3_A/I <sup>(1)</sup>	0.096	I	3200	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

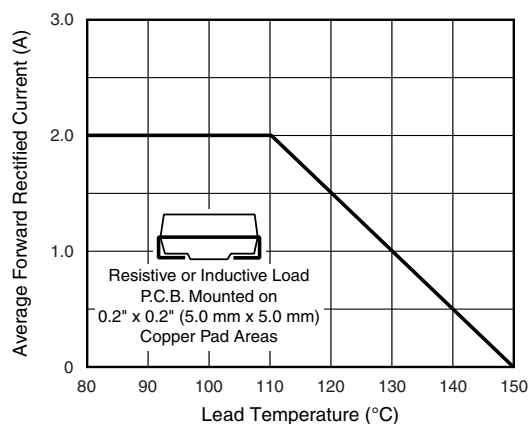
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

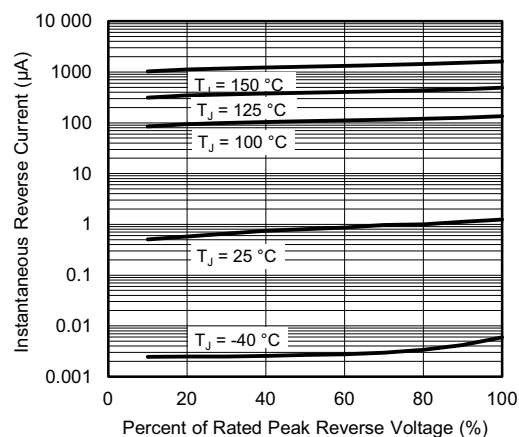


Fig. 4 - Typical Reverse Leakage Characteristics

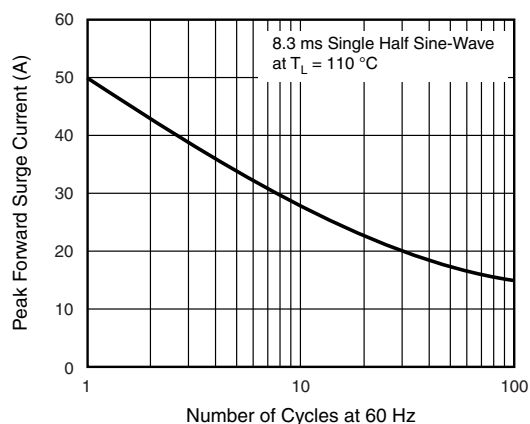


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

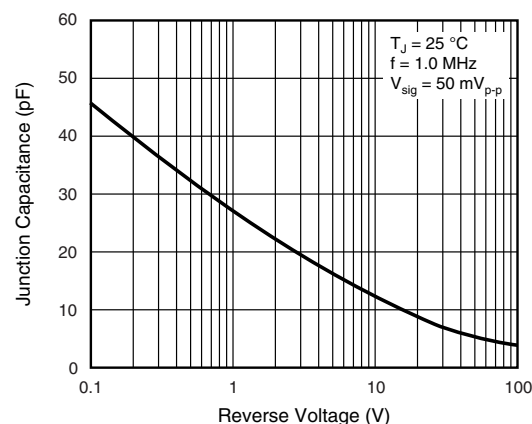


Fig. 5 - Typical Junction Capacitance

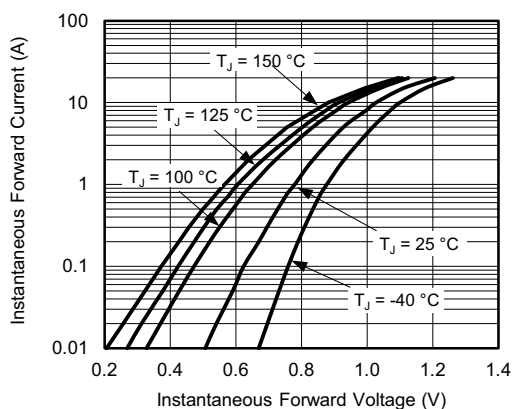


Fig. 3 - Typical Instantaneous Forward Characteristics

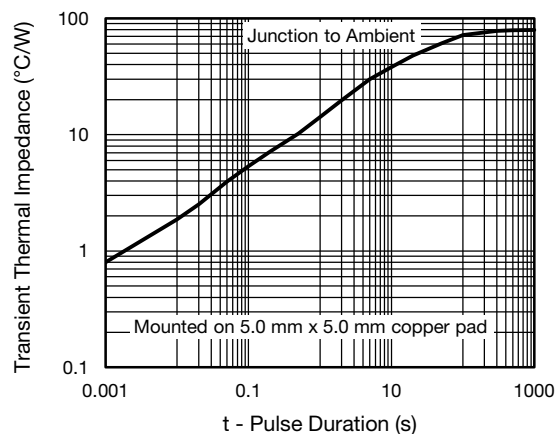
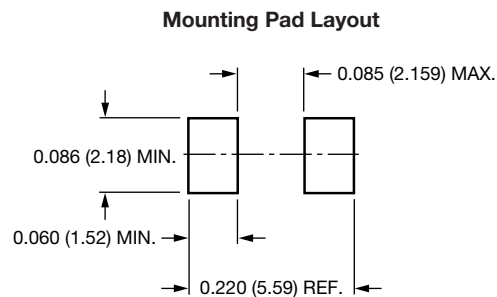
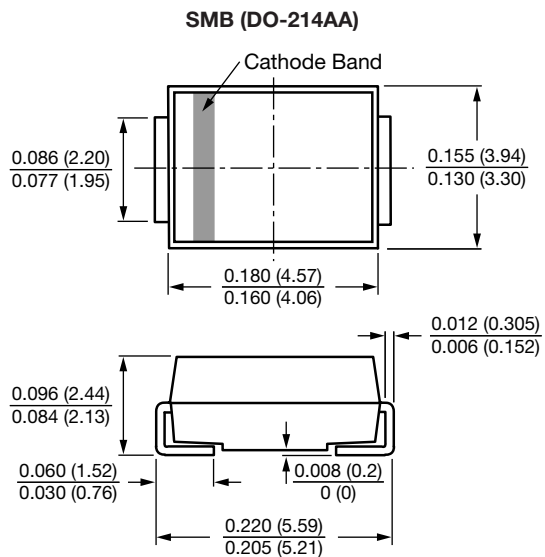


Fig. 6 - Transient Thermal Impedance



**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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